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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/885,782	06/20/2001	Claude Basso	RAL920000111US1	3663
25299	7590	06/28/2004	EXAMINER	
IBM CORPORATION			ZHEN, LI B	
PO BOX 12195				
DEPT 9CCA, BLDG 002				
RESEARCH TRIANGLE PARK, NC 27709			ART UNIT	PAPER NUMBER
			2126	

DATE MAILED: 06/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/885,782	BASSO ET AL.
	Examiner Li B. Zhen	Art Unit 2126

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 20 June 2001.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-14 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1 – 14 are pending in the application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1 – 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent NO. 6,496,510 to Tsukakoshi in view of U.S. Patent NO. 6,643,706 to Marques.**

4. As to claim 1, Tsukakoshi teaches the invention substantially as claimed including a network environment [a network in which a cluster-type router is used; col. 3, lines 40 – 65] including one or more network processing (NP) devices [router node 12, Fig. 1; col. 3, lines 65 – 67; col. 4, lines 50 – 67] implemented for communicating packets [each router node exchanges routing protocol packets with other routers; col. 2, lines 3 – 8], each NP device supporting a forwarding table [Each router node 12 generates the routing table 22 from the link state database 21 for use in packet forwarding; col. 4, lines 50 – 57] comprising entries to enable forwarding of received data packets [routing table 22 generated by each router node 12 in the cluster-type router 11 according to the SPF algorithm contains one or more entries; col. 4, lines 57 –

67] from a source device to a destination device [the packet sender/receiver 17 of the router node 12 sends and receives routing protocol packets; col. 5, lines 34 – 45] according to a routing protocol via a network connection [router 25 transfers routing protocol packets to or from the cluster-type router 11 to get network connection information; col. 3, lines 43 – 63], the network device routing receiving updated forwarding table entries from one or more network control devices executing routing protocol applications [packet sender/receiver 17 sends update information to the database integrator 18 and the routing table calculator 19 to inform them that the link state database 21 has been updated, and passes the update contents to them; col. 5, line 45 – col. 6, line 8], a method for updating forwarding table entries comprising:

a) generating for each forwarding table entry update a data structure [packet sender/receiver 17 sends update information to the database integrator 18 and the routing table calculator 19 to inform them that the link state database 21 has been updated, and passes the update contents to them; col. 5, lines 43 – 49] indicating identification of the routing protocol application [database contains, for the cluster-type router 11 and each router 25 connected to the cluster-type router 11, information on the router ID; col. 4, lines 30 – 43] and a version of a particular routing protocol application instance generating the entry update [packet sender/receiver 17 checks if the received network connection information matches the contents of the link state database 21; col. 6, lines 27 – 48], the data structure received by the forwarding table and incorporated within a respective forwarding table entry [Upon receiving information from the packet

sender/receiver 17 saying that the link state database 21 has been updated...the routing table calculator 19...writes the result into the routing table 22; col. 5, lines 48 – 60];

c) deleting the designated forwarding table entries, whereby old forwarding table entries in the forwarding table are updated efficiently without disrupting packet forwarding process [If they do not match, that is, if the existing information must be updated or deleted or new information must be added, the packet sender/receiver 17 updates the link state database 21; col. 6, lines 27 – 47].

5. Although Tsukakoshi teaches the invention substantially as claimed, Tsukakoshi does not specifically teach identifying for deletion forwarding table entries having data structures matching a designated selection criteria.

However, Marques teaches identifying for deletion forwarding table entries having data structures [action of determining which routing changes are of interest to any one routing protocol is referred to herein as "filtering"; col. 8, lines 30 – 48] matching a designated selection criteria [One way to implement filtering is to apprise routing table module 230 of the need for one (or more) of routing protocols 220(1)-(N) to be notified of changes in routes by one or more of routing protocols 220(1)-(N)... alternative to this approach is to allow each routing protocol to filter out notifications of interest; col. 8, lines 49 – 61].

6. It would have obvious to a person of ordinarily skilled in the art at the time of the invention to apply the teaching of identifying for deletion forwarding table entries having data structures matching a designated selection criteria as taught by Marques to the invention of Tsukakoshi because this allows processes to update their information

regarding connections asynchronously without the use of buffering and simplifies the distribution of such information and allows the processes to proceed at their own pace [col. 3, lines 37 – 43 of Marques].

7. As to claim 9, Tsukakoshi as modified teaches a system for ensuring packet routing in a networking environment [a network in which a cluster-type router is used; col. 3, lines 40 – 65 of Tsukakoshi] including one or more network processing (NP) devices [router node 12, Fig. 1; col. 3, lines 65 – 67; col. 4, lines 50 – 67 of Tsukakoshi] implemented for communicating packets [each router node exchanges routing protocol packets with other routers; col. 2, lines 3 – 8 of Tsukakoshi], each NP device supporting a forwarding table [Each router node 12 generates the routing table 22 from the link state database 21 for use in packet forwarding; col. 4, lines 50 – 57 of Tsukakoshi] comprising entries to enable forwarding of received data packets [routing table 22 generated by each router node 12 in the cluster-type router 11 according to the SPF algorithm contains one or more entries; col. 4, lines 57 – 67 of Tsukakoshi] from a source device to a destination device [the packet sender/receiver 17 of the router node 12 sends and receives routing protocol packets; col. 5, lines 34 – 45 of Tsukakoshi] according to a routing protocol via a network connection [router 25 transfers routing protocol packets to or from the cluster-type router 11 to get network connection information; col. 3, lines 43 – 63 of Tsukakoshi], the network device routing receiving updated forwarding table entries from one or more network control devices executing routing protocol applications [packet sender/receiver 17 sends update information to the

database integrator 18 and the routing table calculator 19 to inform them that the link state database 21 has been updated, and passes the update contents to them; col. 5, line 45 – col. 6, line 8 of Tsukakoshi], the system comprising:

control mechanism for generating a data structure [packet sender/receiver 17 sends update information to the database integrator 18 and the routing table calculator 19 to inform them that the link state database 21 has been updated, and passes the update contents to them; col. 5, lines 43 – 49 of Tsukakoshi] indicating identification of the routing protocol application [database contains, for the cluster-type router 11 and each router 25 connected to the cluster-type router 11, information on the router ID; col. 4, lines 30 – 43 of Tsukakoshi] and a version of a particular routing protocol application instance when a forwarding table is to be updated [packet sender/receiver 17 checks if the received network connection information matches the contents of the link state database 21; col. 6, lines 27 – 48 of Tsukakoshi];

communications interface for enabling forwarding of the data structure to the NP device with each corresponding updated table entry [Upon receiving information from the packet sender/receiver 17 saying that the link state database 21 has been updated; col. 5, lines 48 – 60 of Tsukakoshi];

mechanism for incorporating received data structure into the forwarding table entry when updating the forwarding table entry [the routing table calculator 19...writes the result into the routing table 22; col. 5, lines 48 – 60 of Tsukakoshi]; and,

synchronization mechanism for identifying forwarding table entries having data structures matching a designated selection criteria [One way to implement filtering is to

apprise routing table module 230 of the need for one (or more) of routing protocols 220(1)-(N) to be notified of changes in routes by one or more of routing protocols 220(1)-(N)... alternative to this approach is to allow each routing protocol to filter out notifications of interest; col. 8, lines 49 – 61 of Marques] and deleting those forwarding table entries having data structures matching the designated selection criteria, whereby old forwarding table entries in the forwarding table are updated efficiently without disrupting packet forwarding process [If they do not match, that is, if the existing information must be updated or deleted or new information must be added, the packet sender/receiver 17 updates the link state database 21; col. 6, lines 27 – 47 of Tsukakoshi].

8. As to claim 2, Tsukakoshi as modified teaches the selection criteria includes a value [node's index] representing a version of a particular routing protocol application instance, and identifying the forwarding table entries having data structure indicating the value [the modification and deletion of existing routes in routing table 240 require that the current node's index be updated (step 1035). Thus, as nodes are added, modified, or deleted, the node's index is set to the current value of the master index in order to indicate the fact of that node's altered status; col. 13, lines 20 – 43 of Marques].

9. As to claim 3, Tsukakoshi as modified teaches the selection criteria includes an identification of the routing protocol application and the step of identifying the forwarding table entries having data structure indicating the routing protocol application [One way

to implement filtering is to apprise routing table module 230 of the need for one (or more) of routing protocols 220(1)-(N) to be notified of changes in routes by one or more of routing protocols 220(1)-(N)... alternative to this approach is to allow each routing protocol to filter out notifications of interest; col. 8, lines 49 – 61 of Marques].

10. As to claim 4, Tsukakoshi as modified teaches the selection criteria includes a range of values indicating versions of particular routing protocol application instances and identifying the forwarding table entries having data structure indicating a version falling within the range [the routing protocol's index is less than the index of the current node, this indicates that the route represented by the current node has not yet been processed by the routing protocol in question, and, assuming that this route is of interest to the routing protocol in question, the route is processed by the routing protocol; col. 16, lines 25 – 54 of Marques].

11. As to claim 5, Tsukakoshi as modified teaches the method for updating forwarding table entries is performed by one or more network control devices [database integrator 18 in the receiving router node 12, which receives the update information, reflects the update information on its own link state database 21; col. 5, lines 60 – 63 of Tsukakoshi].

12. As to claim 6, Tsukakoshi as modified teaches generating the selection criteria [One way to implement filtering is to apprise routing table module 230 of the need for

one (or more) of routing protocols 220(1)-(N) to be notified of changes in routes by one or more of routing protocols 220(1)-(N); col. 8, lines 49 – 61 of Marques].

13. As to claim 7, Tsukakoshi as modified teaches the step of generating the selection criteria is performed by the one or more network control devices [filtering is performed by routing table module 230 on routing table 240 determining if the routing protocol requires notification; col. 11, lines 28 – 36 of Marques].

14. As to claim 8, Tsukakoshi as modified teaches the forwarding table is a binary tree structure having leaves comprising the table entries [a radix tree 800 that can be used to implement routing table 240. A radix tree is an m-ary tree in which objects (e.g., routes) can be stored such that those objects are searchable using a key; col. 12, lines 13 – 27 of Marques] and the step of implementing a scanning technique for ascertaining the designations at each of the leaves [determination is made as to whether or not the current node is a leaf node (step 1230)....If the current node is not a leaf node, Process Subtree is again executed (step 1240) in order to process the subtree(s) of the current node; col. 14, lines 15 – 39 of Marques].

15. As to claims 10 – 14, these are rejected for the same reasons as claims 2 – 4, 6 and 8 above.

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent NO. 6,678,274 to Walia teaches a system and method for managing forwarding table lookups.

U.S. Patent NO. 6,192,051 to Lipman teaches a network routing apparatus that employs multi-level tree data structures in a centralized routing table and in distributed forwarding tables.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Li B. Zhen whose telephone number is (703) 305-3406. The examiner can normally be reached on Mon - Fri, 8:30am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai An can be reached on (703) 305-9678. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Li B. Zhen
Examiner
Art Unit 2126

Ibz
June 22, 2004


MENG-AL T. AN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100